

WHAT IS CLAIMED IS:

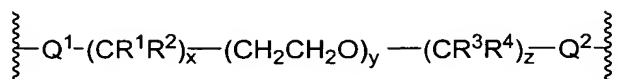
1                    1.        A metal ion coordinating component of a luminescent metal ion  
2 complex comprising:  
3                    (i) a solid support covalently bonded to a non-nucleic acid spacer;  
4                    (ii) a nucleobase covalently bonded to said non-nucleic acid spacer, wherein  
5 said nucleobase comprises a nitrogenous base;  
6                    (iii) a linker covalently bonded to said nitrogenous base; and  
7                    (iv) a metal ion coordinating moiety covalently bonded to said linker to form  
8 said metal ion coordinating component.

1                    2.        The metal ion coordinating component of claim 1, wherein said first  
2 nucleobase is covalently bonded to an oligonucleotide.

1                    3.        The metal ion coordinating component of claim 2, wherein said  
2 oligonucleotide comprises from 1 to 5 additional metal ion coordinating moieties covalently  
3 bound to said oligonucleotide.

1                    4.        The metal ion coordinating component of claim 1, wherein said metal  
2 ion coordinating moiety is a bidentate metal ion coordinating moiety.

1                    5.        The metal ion coordinating component of claim 1 wherein said linker  
2 has the formula:



4                    wherein,

5                     $\text{R}^1$ ,  $\text{R}^2$ ,  $\text{R}^3$ , and  $\text{R}^4$  are individually selected from the group consisting of  
6                    hydrogen, halogen, -OH, substituted or unsubstituted alkyl, substituted or  
7                    unsubstituted heteroalkyl, substituted or unsubstituted cycloalkyl,  
8                    substituted or unsubstituted heterocycloalkyl, substituted or unsubstituted  
9                    aryl, substituted or unsubstituted heteroaryl, and  $\text{OR}^5$ , wherein  
10                     $\text{R}^5$  is selected from hydrogen and substituted or unsubstituted alkyl;  
11                     $\text{Q}^1$  and  $\text{Q}^2$  are individually selected from the group consisting of a bond,  
12                    substituted or unsubstituted alkyl, and substituted or unsubstituted  
13                    heteroalkyl;  
14                    x and z are individually selected from the integers 0 to 100;

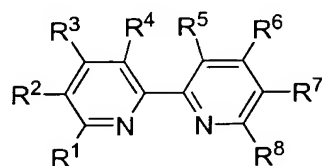
15 y is selected from the integers 1 to 100.

1 6. The metal ion coordinating component of claim 4, wherein said  
2 bidentate metal ion coordinating moiety is selected from the group consisting of substituted  
3 or unsubstituted bipyridyl, substituted or unsubstituted phenanthroline, substituted or  
4 unsubstituted 2,4 pentanediene, substituted or unsubstituted hydroxamate, substituted or  
5 unsubstituted terpyridine, substituted or unsubstituted dipyridophenazine, and substituted or  
6 unsubstituted acetylacetonate.

1 7. The metal ion coordinating component of claim 4, wherein said  
2 nitrogenous base is selected from the group consisting of guanine, thymine, cytosine,  
3 adenine, and uracil.

1 8. The metal ion coordinating component of claim 4, wherein said solid  
2 support is controlled pore glass.

1 9. The metal ion coordinating component of claim 4, wherein said  
2 bidentate metal ion coordinating moiety has the formula:



3  
4 wherein,

5 R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, and R<sup>8</sup> are independently selected from the group  
6 consisting of hydrogen, substituted or unsubstituted alkyl, substituted or  
7 unsubstituted heteroalkyl, substituted or unsubstituted cycloalkyl,  
8 substituted or unsubstituted heterocycloalkyl, substituted or unsubstituted  
9 aryl, and substituted or unsubstituted heteroaryl, OR<sup>A</sup>, NR<sup>B</sup>R<sup>C</sup>, NR<sup>D</sup>OR<sup>E</sup>,  
10 SR<sup>F</sup>, and SO<sub>2</sub>R<sup>G</sup> wherein

11 R<sup>4</sup> and R<sup>5</sup> are optionally joined together with the atoms to which they are  
12 attached to form a 3 to 8 membered ring,

13 R<sup>A</sup>, R<sup>B</sup>, R<sup>C</sup>, R<sup>D</sup>, R<sup>E</sup>, R<sup>F</sup>, and R<sup>G</sup> are independently selected from the group  
14 consisting of hydrogen, substituted or unsubstituted alkyl, substituted  
15 or unsubstituted heteroalkyl, substituted or unsubstituted cycloalkyl,  
16 substituted or unsubstituted heterocycloalkyl, substituted or  
17 unsubstituted aryl, and substituted or unsubstituted heteroaryl, and

18                    one of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, and R<sup>8</sup> is attached to said linker.

1                    10.     The metal ion coordinating component of claim 4, further comprising a  
2     quencher of excited state energy.

1                    11.     The metal ion coordinating component of claim 4, further comprising a  
2     metal ion, a second metal ion coordinating component, and a third metal ion coordinating  
3     component, wherein said metal ion coordinating component, said second metal ion  
4     coordinating component and said third metal ion coordinating component are coordinated to  
5     said metal ion to form said luminescent metal ion complex.

1                    12.     The metal ion coordinating component of claim 11, wherein said metal  
2     ion coordinating component comprises a first bidentate metal ion coordinating moiety, said  
3     second metal ion coordinating component comprises a second bidentate metal ion  
4     coordinating moiety, and said third metal ion coordinating component comprises a third  
5     bidentate metal ion coordinating moiety.

1                    13.     The metal ion coordinating component of claim 11, wherein said first  
2     bidentate metal ion coordinating moiety, said second bidentate metal ion coordinating  
3     moiety, and said third bidentate metal ion coordinating moiety are individually selected from  
4     the group consisting of substituted or unsubstituted bipyridyl, substituted or unsubstituted  
5     phenanthroline, substituted or unsubstituted 2,4 pentanediene, substituted or unsubstituted  
6     hydroxamate, substituted or unsubstituted terpyridine, and substituted or unsubstituted  
7     acetylacetonate.

1                    14.     The metal ion coordinating component of claim 11, wherein said metal  
2     ion is selected from the group consisting of ruthenium, osmium, and rhenium.

1                    15.     The metal ion coordinating component of claim 11, further comprising  
2     a quencher of excited state energy.